

Gap, 7; Fort Bidwell, trace. *Colorado*.—Alma, 39; Breckenridge, 22; Ward District, 19.1; Como (near), 16; Thon and Cumbres, 12; Husted and Castle Rock, 10; Georgetown, 9; Stunner, 8.8; Dillon, 7.5; Idaho Springs, 7; Le Roy, 6.5; Kirk and Carson, 6; Red Cliff, 5.5; First View, Stanford, and Yuma, 4; Leslie and Akron, 2.5; Jefferson, 1.4; Greenhorn, and Denver, 1; Watervale, and Magnolia, 0.5; Fort Logan, 0.1; Haxtum and Sheridan Lake, trace. *Connecticut*.—New London, Canton, Falls Village, Middletown, and Wallingford, trace. *Illinois*.—Chicago and Riley, trace. *Indiana*.—Angola, 0.2. *Iowa*.—Dubuque, Fairfield, and Marshalltown, trace. *Maine*.—Calais, Lewiston, and Mayfield, trace. *Maryland*.—Baltimore, trace. *Massachusetts*.—Amherst Experiment Station (2), Fort Warren, Mount Nonotuck, Provincetown, Royalston, and Taunton (3 and 4), trace. *Michigan*.—Roscommon, 0.5; Alpena, Port Huron, Sault de Ste. Marie, Atlantic, Calumet, Mottville, and North Marshall, trace. *Minnesota*.—Alexandria, 1.5; Saint Vincent, 1.7; Montevideo, trace. *Montana*.—Virginia City, 6.5; Helena, 3; Fort Assinniboine, 1; Camp Poplar River and Choteau, trace. *Nebraska*.—Fort Sidney, 8.5; Kimball, 5.5; Valentine, Fort Niobrara, Gering, and Hay Springs, trace. *Nevada*.—Belmont, 14; Palmetto, 9; Ely, 8; Austin, 6.5; Pioche, 5; Virginia City, 4.5; Eureka, 2.5; Lewer's Ranch, 1.5; Carson City, 1.2; Palisade, 1; Candelaria, Genoa, and Monitor's Ranch, trace.

New Hampshire.—Littleton, 2; Manchester, Hanover (1), Plymouth, and West Milan, trace. *New Jersey*.—Atlantic City, Moorestown, and South Orange, trace. *New Mexico*.—Monero, 0.2. *New York*.—Malone, 4; Le Roy, 3; Sherman, 2.5; Arcade (1) and Lockport, 2; South Canistota and Brookfield, 1.5; Cooperstown, New Lisbon, and Turin, 1; Oxford, 0.9; Perry City, 0.8; Buffalo, Alfred Centre, Ithaca, and Syracuse, 0.5; Albany, New York City, Oswego, Rochester, Geneva, Honeymead Brook, Lyons, Madison Barracks, Middletown, Ogdensburg (1), Poughkeepsie, and Watervliet Arsenal, trace. *North Dakota*.—Fort Pembina, 0.5; Bismarck, 0.3; Fort Buford and Grafton, trace. *Ohio*.—Bangorville, Garrettsville, Hiram, New Alexandria, Orangeville, and Weymouth, trace. *Oregon*.—Joseph, 0.8; Happy Valley, trace. *Pennsylvania*.—Corry, 2; Wellsborough, 1.5; Blue Knob, Dyberry, and Pleasant Mount, 1; Greenville, Selin's Grove, and Wilkesbarre, 0.5; Le Roy, 0.4; Grampian Hills and Salem Corners, 0.3; Harrisburg, Blooming Grove, Kilmer, Quakerstown,

and Ridgway, trace. *Rhode Island*.—Kingston (1), trace. *South Dakota*.—Cross and Spearfish, 1.5; Fort Meade, 1.1; Wolsey and Forestburgh, 1; Huron, 0.6; Fort Sully, 0.4; De Smet and Egeland, 0.3; Rapid City, 0.2; Kimball, 0.1; Flandreau, Fort Bennett, Millbank, Parkston, and Saint Lawrence, trace. *Vermont*.—Chelsea and Strafford, 1; Brattleborough (2), Burlington, and Jacksonville, trace. *West Virginia*.—Tannery and Weston, trace. *Wisconsin*.—Hayward, trace. *Wyoming*.—Laramie, 5; Fort Washakie, 4; Cheyenne, 3.3; Fort Yellowstone, 0.5; Fort Fetterman, trace.

HAIL.

Description of the more severe hail storms of the month is given under "Local Storms." Hail was reported as follows: 1st, Md., Mo., Mont., N. C., S. Dak., Va. 2d, Colo., Kans., Ky., Mo., Nebr. 3d, Colo., Idaho, Iowa, Kans., Miss., Mo., N. C. 4th, Ala., Ill., La., Miss., Ohio. 5th, Colo., Ind., Kans., N. H., N. C. 6th, Colo., Del., Iowa, N. J., N. Y., Oregon, Pa. 7th, Colo., Iowa, Mont., N. Mex., Oregon. 8th, Mont., N. Mex. 9th, Ariz., Fla., Wis. 10th, Colo., Fla., Iowa, Kans., N. Dak. 11th, Ariz., Colo., Kans., N. Mex., Tex. 12th, N. H., N. Mex., N. C. 13th, Colo., Kans., N. C., S. C. 14th, Colo., Kans., N. Mex., Utah. 15th, Colo., Fla., Kans., N. Mex., Oregon. 16th, Kans., Nev., Tex. 17th, Ark., Colo., Ind. T., Nev., Okla. T., Tex., Utah. 18th, Colo., Ga., N. H., Tex., Utah. 19th, Ariz., Colo., Iowa, Kans., Miss., Mo., S. C., S. Dak., Wyo. 20th, Ariz., Colo., Ill., Ind., Iowa, Kans., Mich., Mo., Nebr., N. C., Okla. T., S. Dak. 21st, Ariz., Colo., Ill., Mo., N. Mex., Ohio, Pa., Utah. 22d, Cal., Colo., Ind., Ohio, Tex., Utah. 23d, Ariz., Colo., Kans., Nebr., N. Mex., N. C., Va., Wyo. 24th, Colo., Iowa, N. Mex. 25th, Ala., Colo., Nev., N. Mex., Okla. T., S. C., Tex. 26th, Ark., Colo., Miss., Nev., Oregon, Tenn. 27th, Ariz., Colo., Iowa, Nev. 28th, Cal., Kans., S. Dak. 29th, Iowa, Kans., Minn., Nebr., S. Dak., Tenn., Tex. 30th, Cal., Fla., Iowa, Minn., Nebr., N. C., Oregon, S. C., S. Dak., Tex., W. Va. 31st, Colo., Iowa, Kans., Minn., Mo., Nebr., N. C., Ohio, S. Dak., Va.

SLEET.

Sleet was reported as follows: 2d, Mont. 3d, Nebr. 4th, Iowa, Nebr., Ohio, Pa., S. Dak. 5th, D. C., N. Y., Ohio, Pa. 6th, N. Y., Pa. 8th, S. Dak. 10th, Colo., Iowa, Mich. 13th, 14th, 16th, and 20th, Colo. 21st, Wyo. 24th and 25th, Colo.

WINDS.

The prevailing winds during May, 1891, are shown on Chart II by arrows flying with the wind. In New England, on the northeast slope of the Rocky Mountains, and over the middle plateau region the winds were generally from southeast to southwest; in the west Gulf states, the Missouri Valley, and on the southeast slope of the Rocky Mountains, from southeast to south; in the Rio Grande Valley, from the southeast; in the Ohio Valley and Tennessee, and the lower lake region, from northwest to northeast; in the extreme northwest, from northeast to southeast; in the upper Mississippi valley, from north to northeast; on the middle-eastern slope of the Rocky Mountains, from south to southwest; over the southern plateau region, from southwest to northwest; on the north Pacific coast, northerly; on the south Pacific coast, from west to northwest; and in the middle and south Atlantic and east Gulf states, over the Florida Peninsula, in the upper Lake region, over the northern plateau region, and on the middle Pacific coast, variable.

HIGH WINDS.

[In miles per hour.]

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Signal Service, as follows: 2d, 52, nw., at Cairo, Ill. 4th, 54, w., at Northfield, Vt. 8th, 58,

sw., at Fort Sully, S. Dak. 9th, 51, s., at Chicago, Ill. 20th 60, se., at Lexington, Ky.

LOCAL STORMS.

1st.—A heavy thunder, rain, and hail storm moved southeast over Fredericksburgh, Va., at 5 p. m. A heavy hail storm injured trees, etc., at Lebanon, Mo.

2d.—A severe storm visited Paducah, Ky., between 5 and 6 p. m.; a number of persons were injured, many buildings were damaged by high wind, and the streets were flooded by heavy rain. A thunder-storm moved southeast over Cairo, Ill., at 5.20 p. m., 75th meridian time; heavy rain followed a shift of wind from s. to nw., when it blew a gale for 7 minutes, during 3 minutes of which time the wind reached 60 miles per hour; temperature fell from 74° to 57°; another heavy thunder-storm moved southeast over Cairo in the evening. A hail storm injured fruit at Platte River, Mo. A flouring mill was struck by lightning and burned at Aullville, La Fayette Co., Mo. A very heavy rain storm occurred at Fayette, Mo., At 11 a. m., central time, a storm moved southeast about 5 miles west and 2 miles south of Goodrich, Kans., blowing down trees, houses, etc.; the storm had the appearance of a tornado, was funnel-shaped, and of a dirty, milky appearance, and seemed to rise and fall; when it reached the earth it moved everything,

in a path about 50 yards in width. A thunder, rain, and hail storm at Harvard, Nebr., injured fruit blossoms.

3d.—A severe thunder-storm visited the North Carolina coast in the evening. At Kitty Hawk hail damaged young plants and fruit trees. At Wilmington electric light wires were burned by lightning, and the machinery of the electric light plant was damaged to the extent of \$500.

4th.—A heavy northwest gale prevailed over the east end of Lake Superior, during which a schooner was wrecked and 6 men drowned. At New Orleans, La., a dark cloud charged with electricity moved northeast over the city in the afternoon, attended with but a few drops of rain. Heavy clouds of dust caused a suspension of street traffic. A whirl formed at the corner of Camp and Caliope streets and rapidly attained large proportions, picking up scraps of paper, small pieces of wood, etc. The whirl traveled in an easterly direction; it extended from the ground high into the air, and wrenched a number of slates and shingles from houses. At Meridian, Miss., a thunder-storm, with rain and hail began 1.45 p. m. and ended 4 p. m., eastern time. Hail-stones about one-fourth inch in diameter fell for 15 minutes, and the temperature fell 21°.

5th.—At Wilmington, N. C., a thunder-storm began 1.20 p. m., central time, and hail began 1.30 p. m. and lasted 5 minutes. Considerable damage was caused by hail, and reports from Brunswick and Bladen counties stated that the cotton crop was ruined. A man was killed by lightning in Wayne Co., W. Va.

7th.—A water-spout of moderate size was observed about 3 miles south of Key West, Fla., at 12.15 p. m., central time; it moved east in advance of rain, and had a whirling motion from right to left. At Jupiter, Fla., 2.20 inches of rain fell from 5 a. m. to 5.40 a. m., and the wind reached a velocity of 25 miles per hour from the northeast.

8th.—During a gale a schooner went ashore north of Frankfort, Mich., and 4 men were drowned. At Fort Custer, Mont., light rain, with hail for 5 minutes, began 6.45 p. m. A heavy hail storm was reported in the valley of the Little Big Horn.

11th.—A heavy hail storm occurred at and north of Tip Top, Ariz. Near Elkton, Cecil Co., Md., 5 horses were killed by lightning.

12th.—Destructive thunder and hail storms occurred over south North Carolina in the evening. At Charlotte a severe thunder-storm began at 7 p. m., with fresh e. to ne. wind. At 7.01 p. m. the wind shifted suddenly to nw. and increased in force, with rain and small hail; 1.32 inch of rain fell in 16 minutes, and the wind reached 40 miles per hour. At Bishop, Cal., a barn was struck and a horse killed by lightning.

15th.—Several bridges and a section of railroad embankment in Comanche Co., Kans., were washed away by a cloud-burst. During a north gale at Milwaukee, Wis., in the afternoon, the temperature fell 25° in 10 minutes.

16th.—A wind and hail storm damaged wheat in the north part of Saline Co., Kans.

17th.—Destructive rain and hail storms occurred in Texas. One storm first appeared in Fannin county and moved south-eastward through Lamar, Hopkins, and Franklin counties, and followed a more southerly course through Camp, Upshur, and Gregg counties, causing damage to cotton, small grain, and fruit. A second storm appeared in Montague county, and moved in a southeast and southerly course through Cooke, Denton, Grayson, Collin, Hunt, Kaufman, Van Zandt, Henderson, Anderson, Cherokee, and Houston counties. In the first four counties named the storm was very destructive, wheat and other grains sustaining considerable injury. A third storm appeared in Parker county and apparently moved south, as a storm from the north passed through Travis and Bastrop counties, causing damage to cotton. At Dallas, Tex., lightning struck and exploded a powder magazine. A heavy rain and hail storm visited Hot Springs, Ark., in the evening. During a thunder-storm at Helena, Mont., 2 persons were injured, a horse and a cow were killed, and a house was struck by lightning.

18th.—At Arroyo Grande, Cal., a man was killed and 2 persons were injured by lightning. A woman was killed by lightning 4 miles south of Port Royal, S. C. A man and a horse were killed by lightning in the west part of Dougherty Co., Ga. During high wind at Portland, Me., a yacht was capsized and one person was drowned.

19th.—A heavy thunder-storm, with a strip of hail about one-half mile wide and 8 to 10 miles in length, occurred near Washington, Kans., causing some damage to crops. A cloud-burst occurred in Comanche Co., Kans., and 3 children were drowned. A heavy wind and rain storm prevailed at Egeland, Day Co., S. Dak., during which the wind reached 60 miles per hour. At Howard, S. Dak., a barn was struck by lightning and burned. At Fort Smith, Ark., 3 persons were prostrated by lightning and damage was done to telegraph wires. Some stock were killed by lightning at Conway, Ark. Hail caused some damage at Spartanburg, S. C.

20th.—A ~~tornado~~ which first appeared about two and one-half miles southeast of Sturgeon, Boone Co., Mo., passed eastward about one-fourth mile north of Centralia, Boone Co., Mo., at 3.30 p. m., central time; reached a point about 5 miles north of Mexico, Audrian Co., Mo., about 4 p. m., central time; passed about three-fourths mile north of Rush Hill, Audrian Co., about 4.20 p. m.; and arrived at Laddonia, Audrian Co., about 4.30 p. m., having traveled 30 to 35 miles in a zig-zag generally easterly course in about one hour, the last point of destruction being 35 miles east and 3 miles south of the starting point. The rate of progress of the storm was apparently quite regular, as, so far as can be determined from data at hand, it moved from Centralia to Mexico, a distance of about 15 miles, in 30 minutes; from Mexico to Rush Hill, 9 to 10 miles, in 20 minutes; and from Rush Hill to Laddonia, about 5 miles, in about 10 minutes. After wrecking a barn near Sturgeon the storm traveled 3 miles in a nearly due east direction without causing material damage, and in going 10 miles east it moved one and one-half mile north. For 8 to 9 miles in Audrian Co. no trace was left, the destruction again beginning just north of Mexico, that county, and the scene of greatest destruction extended thence eastward about 15 miles in a path varying from 60 to 300 yards in width, the destruction being greatest at points where the path was narrowest. A report from Centralia states that the funnel-shaped cloud was plainly seen, and that at the beginning there were 6 distinct funnels which came down one at a time and afterward united; that the lightning was incessant and vivid, and the thunder deafening; that heavy rain followed the passage of the cloud; that it was attended by a loud roaring sound, and revolved from right to left; that the width of the path of greatest destruction was about 100 yards; that timbers and trees were thrown east; that ponds and wells were emptied, no water remaining in them after the passage of the storm; and that fowls were plucked of their feathers.

Near Mexico the funnel-shaped cloud was plainly distinguishable; the cloud had a pendant tail, with a white streak which was likened to a huge serpent by some, and by others to a zig-zag white shaft, which appeared and disappeared several times, and extended along the west side of the pendant from top to bottom; a number of small "twisters" were seen spinning along the ground, which united in the air, where, after presenting a steamy white appearance, the cloud became inky black and enveloped and destroyed a barn; a subsidiary storm followed and joined the main storm cloud; at one place the cloud had five pendants; very large hail-stones fell north and east of the storm; houses were torn to pieces; and the air was full of articles carried up. In many instances buildings and trees were carried in a direction opposite to the movement of the storm. Fruit trees had the bark stripped off from the roots to the branches; chickens from which the feathers had been stripped were found in an apparently partially cooked condition; and hedges and trees were plastered with mud. About three-fourths mile north of Rush Hill the tornadic characteristics were plainly seen;

light rain fell before and after the passage of the cloud; the lightning was sharp and the thunder heavy, and very large hail fell; trees on the south side were thrown east, and on the north side west; the path of destruction was 75 to 100 yards in width; the funnel glowed and seemed about one mile high, and a running current was plainly seen in the funnel. At Laddonia similar features were observed.

The track of the tornado was through a thinly settled prairie country, and the trees were small and few in number. The loss of life was confined to Audrain county, where, so far as can be learned, 4 persons were killed and 35 more or less injured. The loss to property is estimated at more than \$100,000.

At Columbia, Mo., a thunder-storm, with rain and hail, began during the night of the 19-20th; a house was struck by lightning, and some damage was done by wind. At Kansas City, Mo., the wind reached a velocity of 42 miles per hour at 7.35 p. m. A wind, rain, and hail storm passed Morley, Mo., about 6 a. m., the path being about 2 miles in width and 10 miles in length. At 7.30 a. m. another hail storm from the northwest traveled across Scott county and crossed the Mississippi River into Illinois, a distance of about 18 miles, in a path about 2 miles in width, destroying crops of all kinds. Each storm lasted about 20 minutes. At 12.30 a. m., local time, a severe storm passed 4 to 5 miles north of Allison, Kans., in an e. s. e. course, with hard rain and hail and heavy thunder and lightning. The path of destruction was one-fourth to three-fourths mile in width and about 8 miles in length. Frame houses were torn to pieces and fragments driven into the ground; stock was killed, and other damage done. A hail storm damaged crops near Salina, Kans. A severe wind and rain storm visited Emporia, Kans., in the evening. A destructive hail, thunder, and rain storm passed over Oklahoma City, Okla. T., in the afternoon. Large hail caused great damage, and some parts of the city were flooded with water. In the southern part of the city a number of small houses were torn to pieces by what appeared to be a tornado, as the wind did not exceed 16 miles per hour. A few miles southwest of the city a man was killed by lightning. Severe thunder-storms occurred in Iowa. In Davenport a building was struck by lightning and burned. At Des Moines a building was struck by lightning and a man stunned. A storm, with distant heavy thunder and lightning, and hail about the size of cherries, passed northeast over Creston, Iowa, at 7.30 a. m., central time, causing damage to buildings to the extent of about \$800. A thunder and wind storm occurred at Harvard, Nebr. At Benton, Ill., a thunder-storm, with heavy rain and hail, moved eastward about noon; fruit and wheat were damaged by hail. A thunder-storm, with hail, was reported at Cairo, Ill.

At Oran, Mo., a storm moved southeast between 7 and 8 a. m., central time, with heavy rain, an exceptionally heavy fall of hail, and unusually severe thunder and lightning. Wheat, fruit, and garden vegetables were destroyed by hail, and one building was unroofed.

A hail storm occurred at Eagle Pass, Ariz., at 4 a. m., the stones being solid, transparent, and about the size of quail eggs. At 1.30 p. m. a similar storm crossed the Gila River above Fort Thomas. A thunder-storm, with heavy rain, caused some damage to buildings at Duluth, Minn. At Red Bluff, Cal., a northwest gale began the morning of the 19th and ended 7 p. m., 20th, with maximum wind 40 miles per hour, and an extreme velocity of 48 miles per hour; considerable damage was caused to fruit trees and grain.

21st.—Severe thunderstorms occurred over south New Jersey. In the evening a thunder-storm, with hail, occurred at Pittsburg, Pa. Heavy thunder-storms occurred in Ohio. At Cleveland a brewery was struck by lightning and burned; loss about \$150,000. Considerable damage was reported at points in central and north Ohio by heavy wind. Near Columbus a man and a horse were killed by lightning.

22d.—At Atlantic City, N. J., a severe wind and rain storm, with thunder and lightning, began 6.30 p. m., the wind

attaining a velocity of 47 miles per hour. Minor damage was caused by the wind, and lightning slightly damaged a switch board at the telegraph office. At Frederick, Md., a wind storm about 5.45 p. m. uprooted trees, etc. At Leonardtown, Md., some damage was caused by a severe wind and thunder-storm at 7.30 p. m. Severe thunder-storms, with rain and hail, were reported in Shelby and Miami counties, Ohio; trees were blown down, and fruit and crops were injured. Destructive hail storms were reported in the counties of east-central Indiana, and heavy wind and rain storms in Cowley and Douglas counties, Kans.

23d.—High wind delayed vessels at Jupiter, Fla. A heavy thunder, rain, and hail storm passed over Raleigh, N. C., between 8 and 10 p. m. The wind reached an extreme velocity of 59 miles, and some damage was caused by hail. Destructive wind, rain, and hail storms were reported in the counties of central and south-central Virginia. A cloud-burst occurred in Curlew Gulch, one mile north of Boise City, Idaho. A large volume of water swept down, flooding parts of the town with several feet of water, and causing damage to Government and private property.

25th.—A heavy hail storm caused damage to crops 6 miles nw. from Wiggins, Ala. Severe hail storms damaged crops in Taylor and Tarrant counties, Texas. At Winnemucca, Nev., a thunder storm, with heavy rain and hail, prevailed from 7 to 7.45 p. m. The storm crossed the valley from the south and was about 1 mile in width; some roofs were damaged and vegetation was beaten down.

26th.—A thunder-storm, with heavy rain, occurred at Charlotte, N. C., in the afternoon. One person was killed by lightning near Charlotte, and damage was caused to crops. At Chattanooga, Tenn., lightning caused trouble to the Electric Street Car Co. A wind and hail storm caused slight damage at Batesville, Miss. Heavy wind and rain prevailed in Gilliam and Morrow counties, Oregon. A squall of wind, with heavy rain, thunder, and lightning, caused a freshet about 10 miles west of Heppner, Morrow Co., Oregon, and large hail-stones fell about 2 miles north of that place. At Arlington, Gilliam Co., damage to buildings was caused by high wind.

27th.—A small water-spout was observed about 1 mile nw. of Key West, Fla., in the evening. A thunder-storm, with very heavy rain, occurred at Jacksonville, Fla., from 12.05 to 1.20 p. m.; high wind, reaching an extreme velocity of 45 miles from the nw., caused some damage in and about the city. A violent thunder-storm, with heavy rain, moved southeast over Augusta, Ga., in the afternoon; from 2.43 to 3.43 p. m. 1.15 inch of rain fell. A heavy wind storm from the sw. caused damage to buildings to the extent of about \$800 at Payette, Idaho. A thunder-storm, with heavy rain and hail, occurred at Winnemucca, Nev., in the afternoon, and the wind reached a velocity of 34 miles per hour from the w. at 3.45 p. m. A severe storm was also reported in the north-east part of Humboldt Co., Nev. A severe thunder-storm, with heavy rain, occurred near Happy Valley, Oregon, and some damage was caused by high water in streams.

29th.—Severe storms occurred in southeast South Dakota. Near Howard, Miner Co., a barn was struck by lightning and burned. In Minnehaha county the rainfall was very heavy.

30th.—A heavy hail storm caused damage to crops at Duke, Fla. A thunder-storm, with heavy rain and some hail, moved eastward over the north part of Taylor Co., W. Va., about 2.30 p. m., central time. Heavy rain fell at Pittsburg, Pa., and 2 houses were struck by lightning. At Alta, Iowa, a thunder-storm, with rain, hail, and high wind, occurred at night, during which a horse was killed by lightning. A gale, with heavy rain and hail, occurred near Webster, S. Dak. A thunder, rain, and hail storm occurred at McMinnville, Oregon. Heavy thunder-storms, with hail and rain, occurred in Yuba and Colusa counties, Cal., causing damage to fruit, etc.

31st.—A man was killed by lightning at Beaufort, S. C. A thunder-storm, with hail, occurred at Weldon, N. C.; some damage was caused by hail. A severe thunder-storm was reported

in Shelby Co., Ohio, and in Preble Co., Ohio, a heavy hail storm caused some damage to crops. A very heavy rain storm caused damage to crops and bridges at Oregon, Mo. A thunder-storm, with heavy rain, and hail the size of walnuts,

occurred at Kansas City, Mo., in the afternoon, with maximum wind velocity 40 miles per hour from the northwest. A destructive rain and hail storm was reported at Lead City, S. Dak.; houses were flooded and washouts occurred on the railroad.

INLAND NAVIGATION.

Heights of rivers above low-water mark, May, 1891 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La	29.9	10	24.4	31	15.4	9.0
<i>Arkansas River.</i>						
Fort Smith, Ark	22.0	31	17.0	19	4.4	12.6
Little Rock, Ark	23.0	9	16.0	22	7.2	8.8
<i>Missouri River.</i>						
Fort Buford, N. Dak		30, 31	11.4	1	4.2	7.2
Sioux City, Iowa	18.7	31	9.8	18	6.7	3.1
Omaha, Nebr	18.0	25, 31	9.3	14, 15, 17, 18	7.5	1.8
Kansas City, Mo	21.0	27	13.7	16, 20	7.8	5.9
<i>Mississippi River.</i>						
Saint Paul, Minn	14.0	1	5.2	28, 29, 30	2.8	2.4
La Crosse, Wis	13.0	1	10.1	31	4.1	6.0
Dubuque, Iowa	16.0	1, 2	13.9	31	4.7	9.2
Davenport, Iowa	15.0	3, 5	10.3	31	3.3	7.0
Keokuk, Iowa	14.0	5, 6	10.3	31	3.9	6.4
Saint Louis, Mo	30.0	5	20.7	22	13.1	7.6
Cairo, Ill	40.0	1	30.0	24, 25	13.7	16.3
Memphis, Tenn	33.0	1	27.2	30	10.8	16.4
Vicksburg, Miss	41.0	1, 2	47.3	31	18.5	28.8
New Orleans, La	13.0	7	15.3	31	9.2	6.1
<i>Ohio River.</i>						
Pittsburg, Pa	22.0	25	7.5	8	1.9	5.6
Parkersburg, W. Va	33.0	25	6.9	19, 21	3.8	3.1
Cincinnati, Ohio	45.0	1	14.7	18	7.9	6.8
Louisville, Ky	24.0	1	7.8	19, 20	4.9	2.9
<i>Cumberland River.</i>						
Nashville, Tenn	40.0	1	10.1	31	2.4	7.7
<i>Tennessee River.</i>						
Chattanooga, Tenn	33.0	1	5.9	25	3.8	2.1
<i>Monongahela River.</i>						
Pittsburg, Pa	29.0	25	7.5	8	1.9	5.6
<i>Savannah River.</i>						
Augusta, Ga	32.0	16	11.8	24, 25, 26	8.1	3.7
<i>Willamette River.</i>						
Portland, Oregon	15.0	31	13.7	3	7.7	6.0
<i>Susquehanna River.</i>						
Harrisburg, Pa	17.0	1	3.7	21, 22, 31	2.0	1.7
<i>Alabama River.</i>						
Montgomery, Ala	48.0	1	6.5	18, 19	3.9	2.6

FLOODS.

The Rio Grande River remained extremely high, and much damage was caused to buildings and other property during the first half of the month. On the 4th the water was running over the banks at several points above Albuquerque, N. Mex., devastating fields. Heavy snow drifts were reported in the mountains of south Colorado. On the 6th a great portion of the southern part of El Paso, Tex., was under water, and the river was rising rapidly at Albuquerque. All streams in north New Mexico were running bank-full, and the snow banks in the mountains were melting slowly. The river continued to rise at El Paso on the 7th, 8th, and 9th, and the Pecos River was the highest ever known. On the 14th the water was slowly subsiding at Albuquerque, and the river reached its highest stage at El Paso on the 15th. The Mississippi River remained above the danger-line at Vicksburg, Miss., until the 15th, and at New Orleans, La., until the 22d. The Lake Concordia, Miss., levee gave way, submerging the Ferriday plantation, and covering a part of the track of the New Orleans and Northwestern Railroad. The rear protection levee of Speranza plantation, 25 miles above New Orleans, broke on the 11th, and the plantation was submerged.

The lower Mississippi river reached a dangerous stage the latter part of February. On the 23d of that month it stood at or near the danger-line at points south of Memphis, Tenn., and on February 26th it reached the danger-line at Memphis and was 1.9 foot above the danger-line at New Orleans, La. During March the river remained above the danger-line south of Memphis, and continued above at Vicksburg and New Orleans during April. The first break in the levees occurred at Vidalia, La., March 10th. Several other breaks occurred in Mississippi and Louisiana, but no serious damage was caused.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 4th, Kent's Hill and Orono, Me.; Lyons, N. Y.; Hayward and Medford, Wis. 7th, Sycamore, Ill.; Alta and Delaware, Iowa; Kent's Hill, Me.; Red Wing, Minn.; South Canisteo, N. Y.; Fort Buford, N. Dak.; Kimball, S. Dak. 8th, Orono, Me. 11th, Glendive, Mont. 13th, Alta and Cresco, Iowa; Kent's Hill, Me.; Blue Hill Observatory and Cambridge, Mass.; Sault de Ste. Marie, Mich.; Montevideo, Minn.; Fort Custer, Mont.; Plymouth, N. H.; Lyons, N. Y.; Fort Sully, S. Dak.; Peshtigo, Wis. 14th, Alta, Iowa; Orono, Me.; Blue Hill Observatory, Mass.; Fort Custer, Mont.; Plymouth, N. H.; Fort Sully and Wolsey, S. Dak. 15th, Webster, S. Dak.; Peshtigo, Wis. 16th and 17th, Fort Custer, Mont. 24th and 25th, South Canisteo, N. Y. 27th, Alta, Iowa. 28th, Hayward, Wis. 29th, Tatoosh Island, Wash.

Fort Custer, Mont., 13-14th: at 10.25 p. m., 13th, an auroral arch extended over about 40° azimuth and to 20° altitude, with "merry dancers" shooting to 40° to 50° altitude. The arch was of a pale yellow color; it disappeared at times, but the "merry dancers" were visible until midnight; they reappeared at 2.30 a. m., 14th, and disappeared at dawn of day.

THUNDER-STORMS.

Thunder-storms were reported as follows: east of the Rocky Mountains thunder-storms were reported in the greatest num-

ber of states, 24, on the 19th; in 23 on the 20th; in 15 to 20 on the 1st, 3d, 11th, 12th, 18th, 21st to 26th, and 29th to 31st; in 10 to 14 on the 2d, 4th, 9th, 10th, 13th, 15th to 17th, 27th, and 28th; in 5 to 9 on the 5th, 7th, 8th, and 14th; and in 3 on the 6th. There was no date for which thunder-storms were not reported east of the Rocky Mountains.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 23, in Iowa and N. C.: on 22 in Mo.; on 21 in Tex.; on 15 to 20 in Fla., Kans., Miss., Nebr., and S. Dak.; on 10 to 14 in Ark., Ga., Ill., Ky., Md., Mich., N. J., N. Dak., Ohio, Okla. T., S. C., Tenn., and Va., on 5 to 9 in Ala., Conn., Ind., La., Me., Mass., Minn., Mont., Pa., and Wis.; and on 1 to 4 in Del., D. C., Ind. T., N. H., N. Y., R. I., Vt., and W. Va. West of the Rocky Mountains thunder-storms were reported in Ariz. on the 4th, 7th to 11th, 19th, 20th, 22d, 23d, 26th, 27th, and 31st; in Cal. on the 13th, 15th, 17th to 20th, 22d to 27th, 29th, and 30th; in Colo. on the 2d, 3d, 5th to 11th, 13th to 28th, and 30th; in Idaho on the 3d, 13th to 16th, 23d to 25th, 27th, 29th, and 30th; in Nev. on the 6th, 7th, 13th, 16th to 18th, 20th to 23d, and 25th to 27th; in New Mex. on the 3d, 4th, 7th, 8th, 10th, 11th, 13th, 14th, 16th, 18th to 21st, and 24th; in Oregon on the 6th, 13th to 15th, and 24th to 31st; in Utah on the 6th, 7th, 13th to 15th, 17th, 18th, 20th to 25th, and 27th to 29th; in Wash. on the 4th, 9th, 12th, 16th, and 25th to 27th; and in Wyo. on the 7th, 14th, 15th, 17th, 21st, 23d, 24th, and 27th.